

Diversity of vascular weeds species in six selected crop fields of Chuadanga district, Bangladesh

Sumaiya Bakar¹, Laila Al Faria¹, Rony Rani¹, Mahbubur Rahman AHM²

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Author Affiliation:

^{1,2}Plant Taxonomy Laboratory, Department of Botany, Faculty of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh

Corresponding Author:

Professor, Department of Botany, Faculty of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh
E-mail: drrahmanahmm@ru.ac.bd

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ABSTRACT

Diversity of vascular weed flora in different crop fields of Chuadanga district, Bangladesh was carried out from November 2018 to February 2020. A total of 69 weed species below 53 genera were recorded and described, belonging to 31 families. Influential families with high species diversity were Asteraceae (18.84%), Amaranthaceae (8.69%), Poaceae (5.79%), Euphorbiaceae (5.79%), Cyperaceae (5.79%), Acanthaceae (4.34%), Marsileaceae (4.34%) and Solanaceae (4.34%). *Barleria prionitis*, *Hygrophylla schulli*, *Senna tora*, and *Ludwigia perennis* were listed as rare species, among the identified species. Out of the total number of species in the study area, 98.55% were recorded in sugarcane field, 91.30% in maize field, 50.72% in Rice field, 47.82% in Jute field, 42.02% in Tobacco field and 37.68% in wheat field. Dicotyledonous species were more influential than monocotyledons. Scientific name, local name, brief taxonomic description, flowering time and family name were recorded for each species.

Keywords: Vascular weed diversity, crop fields, Chuadanga district, Bangladesh

INTRODUCTION

Weed can be described as either an unacceptable plant that grows where it is not required, or an out of position plant. Consequently, rye is an invasive species in a wheat field; so is a cornstalk or even an oak tree in a peanut field. Weeds include all forms of unwanted plants, plants with broadleaves, ferns, shrubs, bushes, water hyacinth, and unwanted flowering plants. Whether such a plant is labeled as weed relies not just on its own features and environment as well as on the relative role among other plants and person. The weed is interesting to a botanist for several purposes.

Weeds which develop excessively in the field and are uncared for have some positive effects. Most weeds have deeper root system that supports the soil and protects it from water and wind stream erosion. In fact, the whole plant body is mixed with soil and humus content after death, and thus enhances soil fertility. Several other nitrogen fixing plants that grow in the field like weeds and in the root systems form bacterial cysts which trap useful atmospheric nitrogen for plants. Many of the weeds can be used as forage.

Significant numbers of weeds are used by local people as medicine in treating various diseases and others are used by farmers as vegetables. The weeds therefore have enormous impact on cultivated plant growth. They grow very quickly and have greater resistance, naturally. These can consume more nutrients, since their root systems are more complex and less fertile soil. A weed is a product deemed unwanted in a given situation, "a plant in the wrong spot." Examples typically are undesirable plants in human-controlled habitats such as farms, plantations, garden beds, and parks. Taxonomically, the term "weed" seems to have no biodynamic importance, because a plant which is a weed in one sense is not a weed when it grows in a position where it is actually desired, and where one plant species is an useful agricultural species, another plant of the same genus could be a significant weed, as in an exotic dandelion continuing to grow by many planted loganberries. Similarly, in a subsequent field, non-profit crops are seemed to be weeds. Many plants which are generally recognized by individuals as weeds are also deliberately grown in lawns and other cultivated situations, in which scenario they are often called profitable weeds. The terminology weed is often used to any plant which intensely expands or propagates, or is destructive beyond its natural environment (Jules, 1979).

Weed species was published in Bangladesh by Rahman and Khatun (2020), Rahman *et al.* (2007), Rahman (2013), Rahman and Akter (2013), Rahman *et al.* (2014), Rahman and Gulshana (2014), Rahman and Rahman (2014), Rahman and Parvin (2015) and Khatun and Rahman (2018). The present research was undertaken to record the diversity of weed species in different crop fields of Chuadanga district, Bangladesh.

MATERIALS AND METHODS

Study area

Chuadanga is positioned in the midwestern part of Bangladesh at 23.60°N, 88.70°E. Key part of the district's western and southern boundary line crosses west Bengal (India). It occupies an area covering 1184.03 km². It meets domestic boundaries with north-eastern Kushtia District, north-west Meherpur, and south- and southeast Jhenaidah. Form the land in this field of research such as fallow land, arable land, grazing land and no grazing land. For this reason, the study area includes different forms of angiosperm weeds. Chuadanga's climate is not marked by significant extremes of heat, coolness, and rainfall due to the district's geographical location, which ensures against the direct action of disruptive forces such as the south sea, the strong east monsoon current, and the north Himalayas. The average monthly rainfall is in July 351.7 mm and the minimum monthly rainfall is in December 13 mm (BPC, 2001).

Methodology

Diversity of weed flora in different crop fields of Chuadanga district, Bangladesh was carried out from November 2018 to February 2020. The identification of the specimens was confirmed with the help of Hooker (1877), Prain (1903), and Ahmed *et al.* (2008-2009). For update nomenclature Pasha and Uddin (2013) and Huq (1986) were also consulted. The specimens are deposited in the Herbarium, Department of Botany, Rajshahi University, Bangladesh for future reference.

RESULTS AND DISCUSSION

Based on this analysis, weed species diversity in six selected crop fields, including rice, wheat, jute, maize, tobacco and sugar cane fields, was identified in the Chuadanga district of Bangladesh, comprising 69 species below 53 genera and 31 families. Asteraceae (18.84%), Amaranthaceae (8.69%), Poaceae (5.79%), Euphorbiaceae (5.79%), Cyperaceae (5.79%), Acanthaceae (4.34%), Marsileaceae (4.34%) and Solanaceae (4.34%) were dominant families with a high diversity of species (Figure 2). Distribution within families of weed species indicates variability. 13 species was recorded in Asteraceae family. Six species was recorded by Amaranthaceae family. Each of Poaceae, Euphorbiaceae and Cyperaceae are recorded by 4 species. Acanthaceae, Marsileaceae and Solanaceae are recorded by 3 species in each. Nyctaginaceae, Chenopodiaceae, Cucurbitaceae, Araceae, Convolvulaceae, Lamiaceae and Onagraceae are represented by 2 species. A single species in each was recorded by 15 families (Table 1). The survey recorded maximum 98.55% species in Sugarcane field followed by Maize field (91.30% species), Rice field (50.72% species), Jute field (47.82% species), Tobacco field (42.02% species) and Wheat field (37.68% species) (Figure 1). Dicot species were more influential than monocot. *Ageratum conyzoides*, *Blumea lacera*, *Chenopodium album*, *Cynodon dactylon*, *Euphorbia hirta*, *Leucas aspera* were dominant weed species in six selected crop fields. The recorded information was comparable with the results of other studies in Bangladesh and abroad like Nithya and Ramamoorthy (2015); Mondal and Hossain (2015); Hassan *et al.* (2015); Akhter and Hussain (2007); Dangwal *et al.* (2011); Khan *et al.* (2012); Singh *et al.* (2012); Punia *et al.* (2013); Rahman *et al.* (2014); Rahman and Rahman (2014) and Rahman and Mamun (2017). No published data reported on the vascular weed species in the crop fields of Chuadanga district,

Bangladesh, so far, the information available. The present study will also aid in further research to classify the main angiosperm weeds.

Table 1. Angiosperms weed diversity in six selected crop fields of Chuadanga District, Bangladesh

Sl. No.	Scientific Name	Family	Local Name	Fields					
				Rice	Wheat	Jute	Maize	Tobacco	Sugarcane
1	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kantanotey	+	+	+	+	+	+
2	<i>Amaranthus lividus</i> L.	Amaranthaceae	Saknote	+	+	+	+	+	+
3	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Sanchirsak	+	+	-	+	+	+
4	<i>Acalypha indica</i> L.	Euphorbiaceae	Muktajhuri	-	-	-	+	-	+
5	<i>Achyranthes aspera</i> L.	Amaranthaceae	Apang	-	-	-	+	-	+
6	<i>Ageratum conyzoides</i> L.	Asteraceae	Ochunti	-	-	+	+	-	+
7	<i>Amaranthus viridis</i> L.	Amaranthaceae	Saknote	+	+	-	+	-	+
8	<i>Anagallis arvensis</i> L.	Primulaceae	Anagalis	+	+	-	+	+	+
9	<i>Axonopus compressus</i> (Sw.) P. Beauv.	Poaceae	Shialkata	+	+	+	+	+	+
10	<i>Blumea lacera</i> L.	Asteraceae	BoroKukshi ma	+	-	+	+	-	+
11	<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Punornova	-	-	+	+	-	+
12	<i>Boerhaavia repens</i> L.	Nyctaginaceae	Punornova	-	-	+	+	-	+
13	<i>Barleria prionitis</i> L.	Acanthaceae	Kantajati	-	-	-	-	-	+
14	<i>Chenopodium album</i> L.	Chenopodiaceae	Batuashak	+	+	+	+	+	+
15	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	chondonbita	-	-	-	+	-	+
16	<i>Coccinia cordifolia</i> Cogn.	Cucurbitaceae	Telakucha	-	-	+	+	-	+
17	<i>Coccinia grandis</i> (L.) Voigt.	Cucurbitaceae	Telakucha	-	-	+	+	-	+
18	<i>Cleome viscosa</i> L.	Capparaceae	Holdeychurc huri	-	-	-	+	-	+
19	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae	Croton	+	+	-	+	-	+
20	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Thankuni	-	-	-	+	-	+
21	<i>Commelina benghalensis</i> L.	Commelinaceae	Kanshia	+	+	+	+	+	+
22	<i>Cyperus rotundus</i> L.	Cyperaceae	Muthaghash	+	+	+	+	+	+
23	<i>Cyperus triceps</i> (Rottb.) Endl.	Cyperaceae	Ghash	+	+	+	+	+	+
24	<i>Chrysopogon asciculatus</i> (Retz.) Trin.	Poaceae	Premkata	+	+	+	+	+	+
25	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Durbaghash	+	+	+	+	+	+
26	<i>Colocasia esculenta</i>	Araceae	Kochu	-	-	+	+	-	+

Sl. No.	Scientific Name	Family	Local Name	Fields					
				Rice	Wheat	Jute	Maize	Tobacco	Sugarcane
	(L.) Schott.								
27	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	Digera	+	+	-	+	+	+
28	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae	Kalokesh	+	+	+	+	+	+
29	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Helencha	+	-	-	+	-	+
30	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae	Malan kuri	+	+	+	+	+	+
31	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Dudhiya	+	+	+	+	-	+
32	<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Dudhiya	+	-	-	+	-	+
33	<i>Glinus oppositifolius</i> (L.) Aug.DC.	Molluginaceae	Gimmashak	-	-	+	-	+	+
34	<i>Heliotropium indicum</i> L.	Boraginaceae	Hatishur	-	-	+	+	-	+
35	<i>Hygrophylla schulli</i> M.R. Almeida & S.M. Ameida	Acanthaceae	Talmakhna	-	-	-	-	-	+
36	<i>Ipomoea alba</i> L.	Convolvulaceae	Kalmishak	+	-	-	-	-	+
37	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Kalmishak	+	-	-	-	-	+
38	<i>Leucas aspera</i> (Willd.) Link.	Lamiaceae	Shetodron	+	+	-	+	+	+
39	<i>Ludwigia adscendens</i> (L.) H. Hara	Onagraceae	Kesordam	-	-	-	+	-	+
40	<i>Leucas cephalotes</i> (Roth) Spreng	Lamiaceae	Dandakolos	+	+	-	+	+	+
41	<i>Launaea asplenifolia</i> (Willd.) Hook.f.	Asteraceae	Tikchaina	-	-	-	+	-	+
42	<i>Ludwigia perennis</i> L.	Onagraceae	Amorkura	-	-	-	+	-	+
43	<i>Marsilea crenata</i> C. Presl.	Marsileaceae	Amrul	+	+	-	+	+	+
44	<i>Marsilea minuta</i> L.	Marsileaceae	Amrul	+	+	-	+	+	+
45	<i>Marsilea quadrifolia</i> L.	Marsileaceae	Amrul	+	+	-	+	+	+
46	<i>Nicotiana plumbaginifolia</i> Viv.	Solanaceae	Bantamak	-	-	-	+	-	+
47	<i>Oxalis corniculata</i> L.	Oxalidaceae	Amrul	+	+	-	+	+	+
48	<i>Portulaca oleracea</i> L.	Portulacaceae	Nunia-shak	+	+	-	+	+	-
49	<i>Parthenium hysterophorus</i> L.	Acanthaceae	Kukursukha	-	-	+	+	-	+
50	<i>Peperomia pellucida</i> Kunth.	Piperaceae	Luchipata	-	-	+	+	-	+
51	<i>Passiflora foetida</i> L.	Passifloraceae	Jhumkolota	-	-	+	+	-	+
52	<i>Physalis minima</i> L.	Solanaceae	Kopal photki	+	+	+	+	+	+

Sl. No.	Scientific Name	Family	Local Name	Fields					
				Rice	Wheat	Jute	Maize	Tobacco	Sugarcane
53	<i>Pouzolzia indica</i> (L.) Gaud.	Urticaceae	Pouzolzia	+	-	-	+	+	-
54	<i>Stephania japonica</i> (Thunb.) Miers.	Menispermaceae	Akanandi	-	-	-	+	-	+
55	<i>Sida cordifolia</i> L.	Dilleniaceae	Berella	-	-	-	+	-	+
56	<i>Senna occidentalis</i> (L.) Link.	Caesalpinaceae	Kalkasunda	-	-	-	+	-	+
57	<i>Senna tora</i> (L.) Roxb.	Fabaceae	Chakunda	-	-	-	-	-	+
58	<i>Solanum nigrum</i> L.	Solanaceae	Titbegun	+	+	+	+	+	+
59	<i>Sonchus asper</i> (L.) Hill.	Asteraceae	Bon palang	-	-	+	+	+	+
60	<i>Sonchus arvensis</i> L.	Asteraceae	Bon palang	-	-	+	+	+	+
61	<i>Synedrella nodiflora</i> (L.) Gaertn.	Asteraceae	Syndrella	-	-	+	+	-	+
62	<i>Scirpus articulatus</i> L.	Cyperaceae	Chechur	+	+	+	+	+	+
63	<i>Scirpus grossus</i> L.f.	Cyperaceae	Choto chchur	+	+	+	+	+	+
64	<i>Tridax procumbens</i> L.	Asteraceae	Treedhara	+	-	-	+	-	+
65	<i>Typhonium trilobatum</i> (L.) Schott.	Araceae	Ghetkol	-	-	+	+	-	+
66	<i>Vernonia patula</i> (Dryand). Merr.	Asteraceae	Kuksim	-	-	-	+	-	+
67	<i>Wedelia biflora</i> (L.) Willd.	Asteraceae	Vringraz	-	-	-	+	-	+
68	<i>Wedelia chinensis</i> (Osbeck) Merr.	Asteraceae	Moha vringaraj	-	-	-	+	-	+
69	<i>Youngia japonica</i> (L.) DC.	Asteraceae	Youngia	-	-	+	+	-	+

+ = Present, - = Absent Total 35 26 33 63 29 68

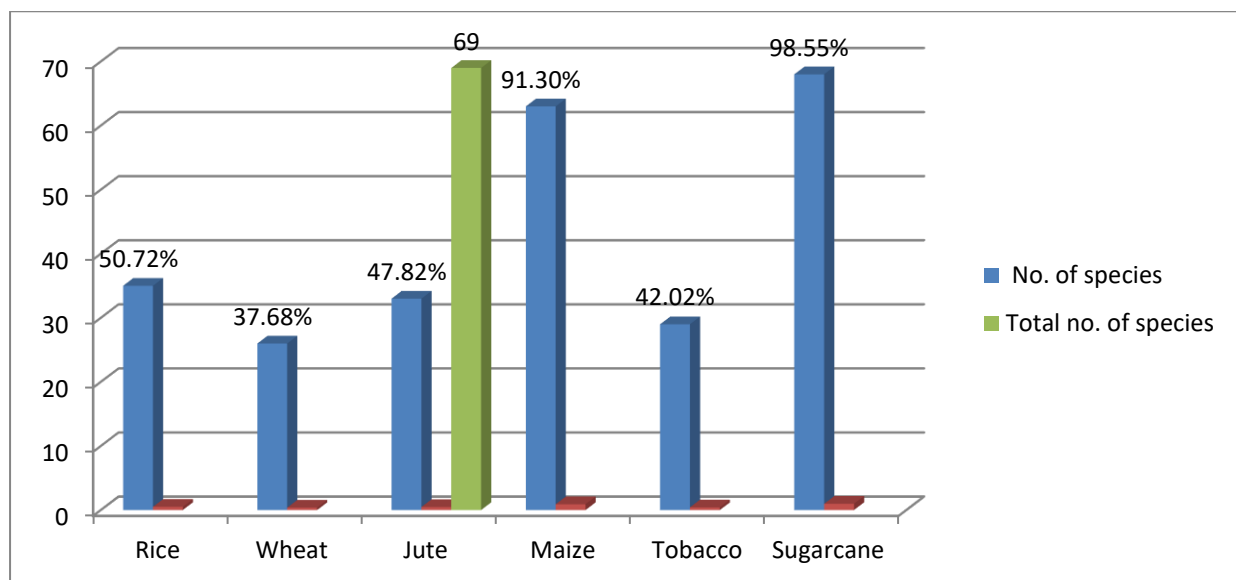


Figure 1: Recorded species diversity in different crop fields.

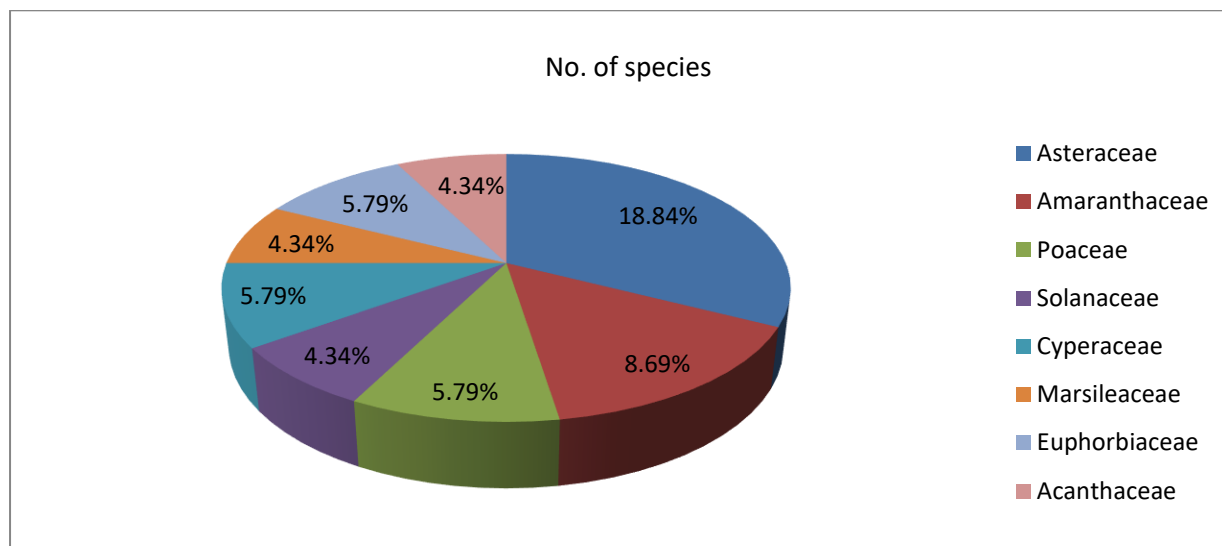


Figure 2: Recorded dominant families in the study area.

CONCLUSION

Diversity of vascular weed flora in different crop fields of Chuadanga district, Bangladesh was carried out from November 2018 to February 2020. A total of 69 weed species below 53 genera were recorded and described, belonging to 31 families. Asteraceae, Amaranthaceae, Acanthaceae, Euphorbiaceae, Poaceae, Marsileaceae, Cyperaceae and Solanaceae were found as dominant families with high species diversity. The present study will help in identifying the angiosperms weed species for further investigation.

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Ethical approval

The ethical guidelines for plants & plant materials are followed in the study for species collection & identification.

Conflict of Interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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